

10 Rec'd PCT/7/10 30 JUN 2004

PATENT COOPERATION TREATY

26 SEP 2003

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

Bridge-Butler, Alan J.
G.F. REDFERN & CO.
7 Staple Inn
Holborn
WC1V 7QF London
GRANDE BRETAGNE

NOTIFICATION OF RECEIPT
OF DEMAND BY COMPETENT INTERNATIONAL
PRELIMINARY EXAMINING AUTHORITY

(PCT Rules 59.3(e) and 61.1(b), first sentence
and Administrative Instructions, Section 601(a))

Date of mailing
(day/month/year)

22-09-2003

Applicant's or agent's file reference
JCBB/SPY

IMPORTANT NOTIFICATION

International application No.

PCT/GB 03/ 00373

International filing date (day/month/year)

29/01/2003

Priority date (day/month/year)

30/01/2002

Applicant

COMPASS GROUP LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority considers the following date as the date of receipt of the demand for international preliminary examination of the international application:

29/08/2003

2. This date of receipt is:



the actual date of receipt of the demand by this Authority (Rule 61.1(b)).



the actual date of receipt of the demand on behalf of this Authority (Rule 59.3(e)).



the date on which this Authority has, in response to the invitation to correct defects in the demand (Form PCT/IPEA/404), received the required corrections.

3. ☐ **ATTENTION:** That date of receipt is **AFTER** the expiration of 19 months from the priority date. Consequently, the election(s) made in the demand does (do) not have the effect of postponing the entry into the national phase until 30 months from the priority date (or later in some Offices) (Article 39(1)). Therefore, the acts for entry into the national phase must be performed within 20 months from the priority date (or later in some Offices) (Article 22). For details, see the *PCT Applicant's Guide*, Volume II.



(If applicable) This notification confirms the information given by telephone, facsimile transmission or in person on:

4. Only where paragraph 3 applies, a copy of this notification has been sent to the International Bureau.

Name and mailing address of the IPEA/

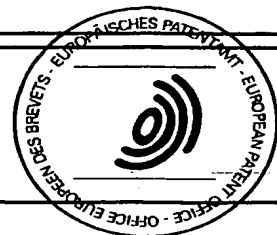


European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Netherlands
Tel.: (+31-70) 340-2040
Fax: (+31-70) 340-3016

Authorized officer

JÜLICH G

Tel. (+31-70) 340-3935



PATENT COOPERATION TREATY

RECEIVED

23 APR 2004

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

Bridge-Butler, Alan J.
G.F. REDFERN & CO.
7 Staple Inn
Holborn
WC1V 7QF London
GRANDE BRETAGNE

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

23.04.2004

Applicant's or agent's file reference
JCBB/SPY

IMPORTANT NOTIFICATION

International application No.
PCT/GB 03/00373

International filing date (day/month/year)
29.01.2003

Priority date (day/month/year)
30.01.2002

Applicant
COMPASS GROUP LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016


Authorized Officer

Jülich, G

Tel. +31 70 340-3935



PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference JCBB/SPY	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)																									
International application No. PCT/GB 03/00373	International filing date (day/month/year) 29.01.2003	Priority date (day/month/year) 30.01.2002																								
International Patent Classification (IPC) or both national classification and IPC B63B39/06																										
Applicant COMPASS GROUP LIMITED et al.																										
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 12 sheets.</p>																										
<p>3. This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"><tr><td style="width: 5%;">I</td><td style="width: 5%;"><input checked="" type="checkbox"/></td><td>Basis of the opinion</td></tr><tr><td>II</td><td><input type="checkbox"/></td><td>Priority</td></tr><tr><td>III</td><td><input type="checkbox"/></td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td>IV</td><td><input type="checkbox"/></td><td>Lack of unity of invention</td></tr><tr><td>V</td><td><input checked="" type="checkbox"/></td><td>Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td>VI</td><td><input type="checkbox"/></td><td>Certain documents cited</td></tr><tr><td>VII</td><td><input type="checkbox"/></td><td>Certain defects in the international application</td></tr><tr><td>VIII</td><td><input type="checkbox"/></td><td>Certain observations on the international application</td></tr></table>			I	<input checked="" type="checkbox"/>	Basis of the opinion	II	<input type="checkbox"/>	Priority	III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	IV	<input type="checkbox"/>	Lack of unity of invention	V	<input checked="" type="checkbox"/>	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	VI	<input type="checkbox"/>	Certain documents cited	VII	<input type="checkbox"/>	Certain defects in the international application	VIII	<input type="checkbox"/>	Certain observations on the international application
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Date of submission of the demand 29.08.2003	Date of completion of this report 23.04.2004																									
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer De Sena Hernandorena Telephone No. +31 70 340-2704																									



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/00373

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-8 received on 29.08.2003 with letter of 29.08.2003

Claims, Numbers

1-24 received on 29.08.2003 with letter of 29.08.2003

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/00373

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	5-9,11-23
	No: Claims	1-4,10,24
Inventive step (IS)	Yes: Claims	
	No: Claims	1-24
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/00373

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following documents, cited in the International Search Report:

D1: GB-A-2 150 890 (LANCER YACHT CORP) 10 July 1985 (1985-07-10)

D2: US-A-2 832 304 (ELYOSIUS DONALD A ET AL) 29 April 1958 (1958-04-29)

- 2 The present application does not meet the requirements of Article 33.2 PCT, because the subject-matter of claims 1-4, 10 and 24 is not new.

- 2a The document D1 discloses (the references in parentheses applying to this document):

A watercraft for sail and mechanical operation (Page 1, lines 6,7) provided with a displacement hull and a keel (Fig. 1), comprising hydrofoil means (11) adapted to only provide lift to the after end of the craft (Page 3, lines 18,19).

It is worth mentioning here that the feature referred to in D1 as "foil" might be considered not to have all the features of a foil. However, the disclosure of D1 attempts to improve the performance of a known, conventional foil by fairing it into the hull side such that it does not extend through the boundary layer. In doing so, the foil does not contribute to drag, thus achieving a substantially theoretical hull speed under sail (Page 2, lines 12-23). This disclosure actually constitutes a foil that has been optimized for its use as a stern-lifting foil for a sailing boat.

The subject-matter of claim 1 is therefore not new.

It is also worth mentioning that, even if claim 1 would be considered as new with respect to D1, the difference between it and D1 would be the use of hydrofoils instead of a planing surface. The problem to be solved would be to increase the efficiency of the lifting surface with respect to that of D1 by using hydrofoils that

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/00373

produce lift at both the upper and the lower surface. This feature is described in document D2 as providing the same advantages as in the present application and with the aim of solving the same problem (See D2, column 1, lines 26-40; fig 1-3). The skilled person would therefore regard it as a normal design option to include this feature in the watercraft described in document D1 in order to solve the problem posed.

Therefore, even if the subject-matter of claim 1 would be considered new with respect to D1, it would not be inventive in view of D1 and D2. Points 2b to 2e below would be applicable to the inventivity of the claims referred to.

- 2b D1 discloses also a watercraft where the lift provided by the hydrofoil means is variable, because hydrofoils produce different lifts at different speeds.

The subject-matter of claim 2 is therefore not new (Article 33.2 PCT).

- 2c D1 discloses as well a watercraft in which the amount of lift provided by the hydrofoil means is determined by the speed of the craft. This is indeed the general case with hydrofoils.

The subject-matter of claim 3 is therefore not new (Article 33.2 PCT).

- 2d D1 discloses similarly a watercraft in which the hydrofoil means is adapted to provide sufficient lift to maintain the craft at a substantially level trim at any speed (Page 3, lines 18,19).

The subject-matter of claim 4 is therefore not new (Article 33.2 PCT).

- 2e The watercraft of D1 has a displacement hull shaped as a mono-hull for high speed sailing, with a transverse cross section which tapers downwardly to its keel line, and which increases in cross section from the bow to a fullest transverse section, and decreases in cross section from the fullest transverse section to the after end, and in which the keel line of the hull tapers downwardly from the bow and the stern to a base line at the fullest transverse section. This is indeed the case of a wine-glass shaped cross section referred to in D1 (Page 2, line 3)

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

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The subject-matter of claim 10 is therefore not new (Article 33.2 PCT).

- 3 Dependent claims 5-9 and 11-23 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (please, see the International Search Report).

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WATERCRAFT

This invention relates to a watercraft which may be used for sailing using wind power, but which can maintain a level trim when mechanically propelled at high speeds.

Sailing craft can be provided with a displacement mono-hull with a transverse cross-section which tapers downwardly on each side to its keel line, and which increases in cross-section from the bow to a fullest transverse section, and decreases in cross section from the fullest transverse section to the after end. Such a mono-hull shape is suitable for sailing because of its streamlined longitudinal shape when upright and when heeled over.

However, displacement mono-hulled sailing craft as described above are not suitable to be mechanically propelled at high speeds. When mechanical propulsion means, for example an outboard motor or a screw, provide high levels of forward thrust to the after end of the hull, the bow is forced out of the water and the aft sinks lower into the water. This slows the craft because its forward facing profile is increased, which results in a greater resistance against the water. The more power which is provided to the after end of the hull, the greater the bow lift and the water resistance. As a result the maximum speed which can be reached is fixed, regardless of the size of the engine. The object of the present invention is to overcome some of these problems and provide a watercraft with a displacement hull which may be used for sailing and be mechanically propelled at high speeds.

According to the present invention a watercraft for sail and mechanical operation provided with a displacement

-2-

hull and a keel, is provided with hydrofoil means adapted to only provide lift to the after end of the hull.

The hydrofoil means can comprise a flat hydrofoil element, which is attached in a transverse arrangement by struts to the bottom of the after end of the hull of the watercraft. When the craft is propelled at a high speed the angle of the hydrofoil is set to provide the optimum level of lift to the aft to maintain the optimum trim level for the particular speed of the craft.

As the speed of the craft changes the angle of the hydrofoil element can be adjusted, either manually or automatically, to provide the optimum level of lift to the aft to maintain an optimum trim level at any speed.

Preferably the watercraft is mono-hulled with a transverse cross-section which tapers downwardly to its keel line, and which increases in cross-section from the bow to a fullest transverse section, and decreases in cross section from the fullest transverse section to the after end. The keel line of the hull tapers downwardly from the bow and the stern to a base line at the fullest transverse section.

The craft can be provided with a drop, or a swing, keel, which is lowered into position to provide ballast when the craft is sailing, and is raised to reduce drag when the craft is propelled mechanically. Further, the craft can also be provided with internal water ballast tanks which can be filled with water to provide ballast when sailing, and emptied to reduce the displacement when the craft is propelled mechanically.

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When the craft is being powered by its sails the hydrofoil is set level to the water flow under the after end of the hull so zero lift and minimum drag are provided and the hull operates as normal. It has been found that the hydrofoil provides stability to the hull when the craft is being sailed and acts as a damper in rough conditions, which are additional benefits

In one construction the hydrofoil is disposed approximately level with the base line of the hull. However, in another construction the hydrofoil is disposed approximately level with the base line of the drop keel. It has been found that with either of these arrangements when the craft is grounded or removed from the water it can be supported in an upright position by the lowest point of the hull or the keel and the hydrofoil, like a tripod, which is an additional benefit.

Preferably the hydrofoil element is attached to the bottom of the hull by two struts. The hydrofoil element can be substantially rectangular in shape, with the shorter sides thereof disposed substantially parallel to the direction of the hull. Further, the hydrofoil element can have a streamlined cross-section with an elongated tear-drop shape, which passes through the water with the least drag.

In one construction the struts are provided with rudder elements adapted to steer the craft. The rudder elements can be fixed aft of the struts, can be provided as part of the struts, or the struts can be the rudder elements. With this arrangement a traditional rudder is not required for the craft, which further reduces drag.

The watercraft can be propelled by an inboard engine, preferably provided with a screw. The screw can have a known

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type of blades which can be rotated to be parallel with the direction of the hull to reduce drag when sailing.

In a preferred construction the hydrofoil element can be rotated from a zero lift angle level with the water flow under the aft end of the hull, to a lift angle of approximately -5 to -8 degrees.

The upper hull of the watercraft can be shaped with a spray rail feature to shield the operators from wash produced at high speeds.

The system can be used on any watercraft, but in a preferred construction the invention is applied to a 13 metre ocean-going yacht, with about 6 berths.

The invention also includes a hydrofoil element for use with a watercraft for sail and mechanical operation provided with a displacement hull and a keel, which is adapted to only provide lift to the after end of the craft.

The invention can be performed in various ways but one embodiment will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a boat hull according to the present invention;

Figure 2 is a perspective view of another boat hull according to the present invention;

Figure 3a is a diagrammatic front view of the cross sectional contours of the hull shown in both Figures 1 and 2;

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Figure 3b is a diagrammatic side view of the hull shown in Figure 3a with the cross-sectional lines;

Figure 4 is a side view of a yacht according to the present invention, arranged for sail operation;

Figure 5 is a side view of the yacht shown in Figure 4 arranged for motorised operation;

Figure 6a is a diagrammatic front view of the cross sectional contours of the hull shown in both Figures 4 and 5; and,

Figure 6b is a diagrammatic side view of the hull shown in Figure 6a with the cross sectional lines.

Figure 1 shows a displacement boat hull 1 which is shaped for sailing and is approximately 13 metres in length. Figures 3a and 3b show the cross-sectional contours of the hull 1. The hull 1 has a broad beam to provide sufficient righting moment to support the sails and provide an adequate lever arm for internal water ballast. In other respects the hull 1 is shaped for high-speed sailing (approximately 10 knots). As shown in Figure 1 the hull 1 is provided with a drop keel 2 with a ballast bulb 3, and a hydrofoil element 4. The hydrofoil element 4 comprises two struts 5 and an interconnecting horizontal wing 6. The wing 6 is substantially rectangular in shape with the shorter sides thereof disposed substantially parallel to the direction of the hull 1. The hydrofoil element is mounted adjacent to the aft 7 of the hull 1.

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In Figure 2 displacement boat hull 8 is identical to the hull 1 shown in Figure 1, except for recess 9 provided on the lower surface. Recess 9 is dimensioned to receive the upper section of the ballast bulb 11 when the keel 10 is raised. Further, struts 12 have been provided with rudder elements 13 to steer the craft.

Figures 4 and 5 show a displacement mono-hulled 13 metre sailing yacht 14. Figures 6a and 6b show the cross-sectional contours of the hull 15. This type of yacht is known so further details will not be described here. The yacht 14 has a hull 15 shaped for sailing, a sailing rig 16 and a motorised screw 17. The hull 15 is also provided with a spray rail ledge 18 to protect the operators of the craft from wash at high speeds. (The shape of the spray rail 18 can be better seen in Figures 6a and 6b). The yacht 14 is provided with a hydrofoil element 19 comprising two struts 20 (only one shown) and an interconnecting horizontal wing (not shown). The hydrofoil element is identical to that shown in Figure 2 with rudder elements 21 provided on the struts 20, and it is attached to the bottom of the hull 15, adjacent to the aft 22 of the yacht 14. The yacht 14 is also provided with a drop keel 23 with a ballast bulb 24. The hull 15 also features a recess (not shown) into which the upper section of the ballast bulb 24 can fit when the drop keel 23 is raised.

As shown in Figure 4 the yacht 14 is set for sail operation with the sailing rig 16 arranged to provide propulsion. The wing (not shown) of the hydrofoil element 19 is set level to the water flow under the after end 22 of the hull so zero lift and minimum drag are provided and the hull 15 can operate as normal.

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As shown in Figure 5 the yacht is set for motorised operation with the sailing rig 16 lowered. The drop keel 23 has been raised and the upper section of the ballast bulb 24 has been received by the recess (not shown) in the bottom of the hull 15. When the screw 17 pushes the yacht through the water at high speeds the wing (not shown) of the hydrofoil element 19 is set at a negative angle and the higher water pressure on the underside of the wing creates lift and holds the yacht 14 at a level trim.

As the speed of the yacht changes the wing is adjusted automatically to provide the optimum level of lift to the aft to maintain an optimum trim level. It will be appreciated that the speed of the yacht can be changed by engine speed as well as sea and weather conditions and any angle of turn, so the wing can be set to respond to these changes to maintain a level trim. It will also be appreciated that the correct wing angles required at high speeds will depend on the size, displacement and engine capacity of the craft with which is it used.

The yacht 14 can be provided with internal water ballast tanks on each side of the hull 15 approximately amidships, in order to provide extra righting moment during sailing. The tanks can be filled automatically when the yacht 14 is in sailing mode, as shown in Figure 4, and then emptied to reduce weight and displacement when the yacht 14 is in motor mode, as shown in Figure 5.

The spray rail 18 protects the occupants of the yacht 14 from water spray created by the high speed of the yacht 14.

Although the above describes the invention as applied to a displacement mono-hulled craft, it will be

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appreciated that the invention can also be applied to a multi-hulled craft. Further, a hydrofoil wing can be attached to the underside of the aft of a water craft in any appropriate manner, for example by one or three struts. In addition, if desired the hydrofoiling effect can be achieved by a number of hydrofoil wings attached to the underside of the hull in any appropriate manner.

CLAIMS

1. A watercraft for sail and mechanical operation provided with a displacement hull and a keel, comprising hydrofoil means adapted to only provide lift to the after end of the craft.
2. A watercraft as claimed in Claim 1 in which the lift provided by the hydrofoil means is variable.
3. A watercraft as claimed in Claim 2 in which the amount of lift provided by the hydrofoil means is determined by the speed of the craft.
4. A watercraft as claimed in Claim 3 in which the hydrofoil means is adapted to provide sufficient lift to maintain the craft at a substantially level trim at any speed.
5. A watercraft as claimed in Claim 4 in which the hydrofoil means comprises a substantially rectangular shaped hydrofoil element, in which the shorter sides thereof are disposed substantially parallel to the direction of the hull, and which is adapted to rotate on a transverse axis to provide variable lift to the after end of the craft.
6. A watercraft as claimed in Claim 5 in which the rotation of the hydrofoil element is controlled manually.
7. A watercraft as claimed in Claim 5 in which the rotation of the hydrofoil element is controlled automatically.

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8. A watercraft as claimed in Claim 6 or Claim 7 in which the hydrofoil element is set level to the water flow under the after end of the hull to provide substantially no lift when the craft is sailing.

9. A watercraft as claimed in Claim 8 in which the hydrofoil element can be rotated from a substantially no lift angle level with the water flow under the after end of the hull, to a lift angle of approximately -5 to -8 degrees.

10. A watercraft as claimed in any of the above claims, in which the displacement hull is a mono-hull shaped for high-speed sailing, with a transverse cross-section which tapers downwardly to its keel line, and which increases in cross-section from the bow to a fullest transverse section, and decreases in cross section from the fullest transverse section to the after end, and in which the keel line of the hull tapers downwardly from the bow and the stern to a base line at the fullest transverse section.

11. A watercraft as claimed in Claim 10 in which the hydrofoil element is attached to the underside of the hull by two struts.

12. A watercraft as claimed in Claim 11 which is provided with a drop keel, which is lowered into position to provide ballast when the craft is sailing, and is raised when the craft is propelled mechanically.

13. A watercraft as claimed in Claim 12 in which the keel is provided with a ballast bulb.

14. A watercraft as claimed in Claim 13 in which a recess is provided in the hull, adapted to receive the upper portion of the ballast bulb when the keel is raised.

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15. A watercraft as claimed in Claim 14 which is provided with internal water ballast tanks which can be filled with water when the craft is sailing, and emptied when the craft is propelled mechanically.
16. A watercraft as claimed in Claim 15 in which the hydrofoil element is disposed substantially level with the base line of the hull.
17. A watercraft as claimed in Claim 15 in which the hydrofoil element is disposed substantially level with the base line of the drop keel when it is in its lowered position.
18. A watercraft as claimed in Claim 16 or Claim 17 in which the hydrofoil element is provided with an elongated tear-drop shaped cross-section
19. A watercraft as claimed in Claim 18 in which the struts are provided with rudder elements adapted to steer the craft.
20. A watercraft as claimed in Claim 19 in which the craft is mechanically propelled by an inboard engine provided with an outboard screw propeller.
21. A watercraft as claimed in Claim 20 in which the blades of the propeller are adapted to be rotated to be substantially parallel with the direction of the hull when the craft is in sailing operation to reduce drag.
22. A watercraft as claimed in Claim 21 in which the hull is shaped with a spray rail.

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• 23. A watercraft as claimed in Claim 22 in which the watercraft is an approximately 6 berth 13 metre ocean-going yacht.

24. A watercraft substantially as described herein and with reference to the accompanying drawings.